

Research article

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Some rare species of sea snakes (Squamata: Serpentes: Elapidae: Hydrophiinae: *Hydrophis*, *Microcephalophis*) from the Indian Coasts and nearby waters, lodged in major systematic Indian zoological collections

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Abstract. Sea snakes of the genera *Hydrophis* Latreille *In* Sonnini & Latreille, 1801 and *Microcephalophis* Lesson, 1832 are also represented by some rare species in India and surrounding waters. Many species of Indian sea snakes are poorly known, except for some common species reported in marine faunal surveys. Here, based on a series of 107 specimens, we elaborate on nine such rare species of the genera *Hydrophis*, viz. *H. jerdoni* (Gray, 1849), *H. lapemoides* (Gray, 1849), *H. mamillaris* (Daudin, 1803), *H. nigrocinctus* Daudin, 1803, *H. stricticollis* Gunther, 1864, *H. viperinus* (Schmidt, 1852) and *H. obscurus* Daudin, 1803 as well as *Microcephalophis*, viz. *M. gracilis* (Shaw, 1802) and *M. cantoris* Gunther, 1864. We furnish data on the morphometrics and colouration in preservation for the above species based on material in the Zoological Survey of India, Kolkata (n=74) and the Bombay Natural History Society Museum, Mumbai (n=33). But for a few (n=19) specimens from Iran, Pakistan, Myanmar and Thailand for four species (*H. jerdoni*, *H. viperinus*, *H. obscurus*, *M. gracilis*), the vast majority of the examined specimens are from Indian coastlines. All material dealt with here are non-types, but include some historical specimens previously examined by European herpetologists. All species of *Hydrophis* and *Microcephalophis* represented here are those native to India. We also illustrate these seven species as preserved vouchers, all belonging to Indian material to further aid their future identifications.

Keywords. Arabian Sea, BNHS, colouration in preservation, scalation, sea snake, morphometry, Indian Ocean, Bay of Bengal, ZSI.

INTRODUCTION

Sea snakes are relatively poorly-represented groups of serpents in both Indian herpetological literature (Ganesh et al., 2019; see below) and Indian herpetological museums (Phipson 1888; Sclater 1891; Das & Chaturvedi 1998; Das et al. 1998; Das & Gayen 2004; Ganesh & Asokan 2010; Ganesh et al. 2020; Mondal et al. 2022). India has a diversity of 20 species of marine snakes, representing 18 species of true sea snakes belonging to the genera *Hydrophis* Latreille *In* Sonnini & Latreille, 1801 and *Microcephalophis* Lesson, 1832 (Ganesh et al. 2019). However, most studies that dealt with sea snakes in India, have time and again reported just a few handful common species. This is understandably so given the fact that they are inherently tough to sample, dependent on (often commercial) fishing vessels and also some climatic fluctuation factors. This limits the scope for active field sampling and collection including site-selection, time-duration of

sampling, selective or species-specific retention and/or discordance of samples as per the research requirements of the academic fraternity involved. Thus, at least in India, the catches or collection sorties are wholly predicated upon the primary, non-aligning interests and motives of the vessels involved (Costello et al. 2010, 2017). Almost always, sea snakes are far from being the primary objective of such missions.

On the whole, literature on Indian sea snakes could be more or less grouped into the following kinds. First, classical 19th and 20th century taxonomic treatises, such as Gunther (1864), Theobald (1868, 1876), Phipson (1888), Boulenger (1890, 1896), Sclater (1891), Wall (1906, 1909) and Smith (1926, 1943). Second, post-Independence studies by Indian herpetologists in the later part of the 20th century (Ahmed, 1975; Murthy, 1977; Myers, 1947). Last, recent scholarship on the subject due to a renewed interest in biodiversity explorations of the country. Either they are in the form of single-species/

single-instance observations (e.g., Chandrasekar et al., 2018; John et al., 2015; Karthikeyan et al., 2008; Parmar, 2018, 2019a,b; Tripathy, 2006) or long-term studies (e.g., Lobo et al. 2004, 2005; Kannan & Rajagopalan 2008; Karthikeyan & Balasubramanian 2008; Padate et al. 2009; Damotharan et al. 2010; Jeyabaskaran et al. 2015; Muthukumaran et al. 2015; Venkatraman et al. 2015; Prachi & Ramesh 2016; Dabhi et al. 2019; Desouza & Rao 2021; Rao et al. 2021; Tambre et al. 2021).

This leads to two issues: (i) higher number of specimen-collections of some common sea snake species, (ii) more frequent reports of certain common species of sea snakes consequent upon such distorted collection missions/parties involved. However, despite the appreciably reasonable efforts put forth by Indian herpetologists in studying and sampling sea snakes in situ, this knowledge gap on other rarer sea snake species has only widened over time. In most cases, these species were merely cited in regional checklists and faunistic studies with little new knowledge coming in. Many recent regional treatises on Indian snakes (Daniel, 2002; Das, 2002; Whitaker & Captain, 2004) could not shed enough light on most of these species. This situation calls for a separate consolidation of data that has got a direct bearing especially on those few rare Indian sea snake species alone. Therefore after consulting publications and perusing museum collections, we cherry-picked seven obscure species of *Hydrophis* Latreille In Sonnini & Latreille, 1801 and two species of *Microcephalophis* Lesson, 1832. We subjected these species to descriptions and illustrations based on vouchered non-types from Indian and in a few exceptions, nearby waters so as to shed more light on these little-known species.

The following recent (post-1970) studies on sea snakes in the Indian coastline did not include any of the rarer sea snake species dealt with in this work. These include Murthy & Rao (1976, 1988), Kalaiarasan & Kanakasabai (1994), Lobo et al. (2004, 2005), Tripathi (2006), Kumar et al. (2007), Karthikeyan & Blasubramanian (2008), Karthikeyan et al. (2008), Padate et al. (2009), Palot & Radhakrishnan (2010), Jeyabaskaran et al. (2015), John et al. (2015), Muthukumaran et al. (2015), Venkatraman et al. (2015), Prachi & Ramesh (2016), Chandrasekar et al. (2018), Parmar (2018, 2019) and Tambre et al. (2020). Hence this study.

MATERIALS AND METHODS

This study is based on an examination of 107 preserved, non-type voucher specimens representing nine species of the genera *Hydrophis* Latreille In Sonnini & Latreille, 1801 and *Microcephalophis* Lesson, 1832 housed in India's leading natural history collections namely: Zoological Survey of India, Kolkata (ZSI, =74) and the Bombay Natural History Society Museum, Mumbai

(BNHS, =33). A total of 17 characters including scalation, measurements and colour pattern were scored from these specimens. Morphometric landmarks, terminologies and method of scoring follow Mondal et al. (2022). Ventrals were counted following Dowling (1951). Examinations were done using LEICA EZ4 model microscopes and photographs of the subject were taken using Nikon D700 model high-resolution digital cameras.

RESULTS

Hydrophis jerdonii (Gray, 1849)

(Fig. 1, Table 1)

Materials examined (n=14). INDIA: ZSI 21819, Mouth of the Arasalar river, Karaikkal, Tamil Nadu, coll. 28.12.1956; ZSI 22477, Gopalpur, Ganjam district, Odisha, coll. G. Ramakrishna 28.12.1962; ZSI 28229, Bay of Bengal, coll. Dr Walsh 20.05.1890; BNHS 2282 (2 ex.), Madras (= Chennai), coll. Frank Wall 31.12.1907; MYANMAR: ZSI 8237, Mergui, Coll. W. Theobald; ZSI 11486-9, Mergui, coll. Dr Anderson, 18.01.1892; THAILAND: ZSI 18579, Patani Bay, Siamese-Malay Strait, coll. Dr N. Annandale; ZSI 18581-83, Singgora, Siam, coll. Dr N. Annandale, January 1916.

Description and Variation. Head short, snout narrowed anteriorly, rostral higher than broad; nostril superior, nasals in contact with each other; prefrontal small, in one specimen triangular (BNHS 2282), not in contact with 2nd supralabial; frontal longer than the distance from the rostral; parietal longer than broad; single anterior temporal, often 6th supralabial fused with temporal; one supraocular on each side of head; one preocular on each side of head; one postocular on each side of head; 6 supralabials on each side of the head, sometimes 5, 3rd and 4th touching the eye, 6th fused with temporal; 6–7 infralabials, rarely 5, 3 infralabials touching chin shield; Chin shield well developed, both the pairs in contact with each other, anterior pair is smaller than the posterior pair; scales around neck 17, rarely 18, only one specimen with 16 (ZSI 18579); scales around midbody 19–22, only one specimen with 23 (ZSI 18582); ventral 214–258, twice the size of the adjacent dorsal scale, posteriorly narrow; preanal slightly enlarged; dorsal scale with single keel; number of bands around the body 30–43, 2–4 bands on tail, one specimen without banding (BNHS 2282); head length 12.1–24.1 mm; head width 4.9–10.7 mm; head depth 4.0–7.6 mm; snout-vent length 375.0–958.0 mm; tail length 50.0–110.0 mm. Dorsum olive grey colour with dark grayish black bands across the body, ventral creamy yellow, tail creamy yellow with dark grayish black bands. Head olive grey dorsally, lower labial creamy white.

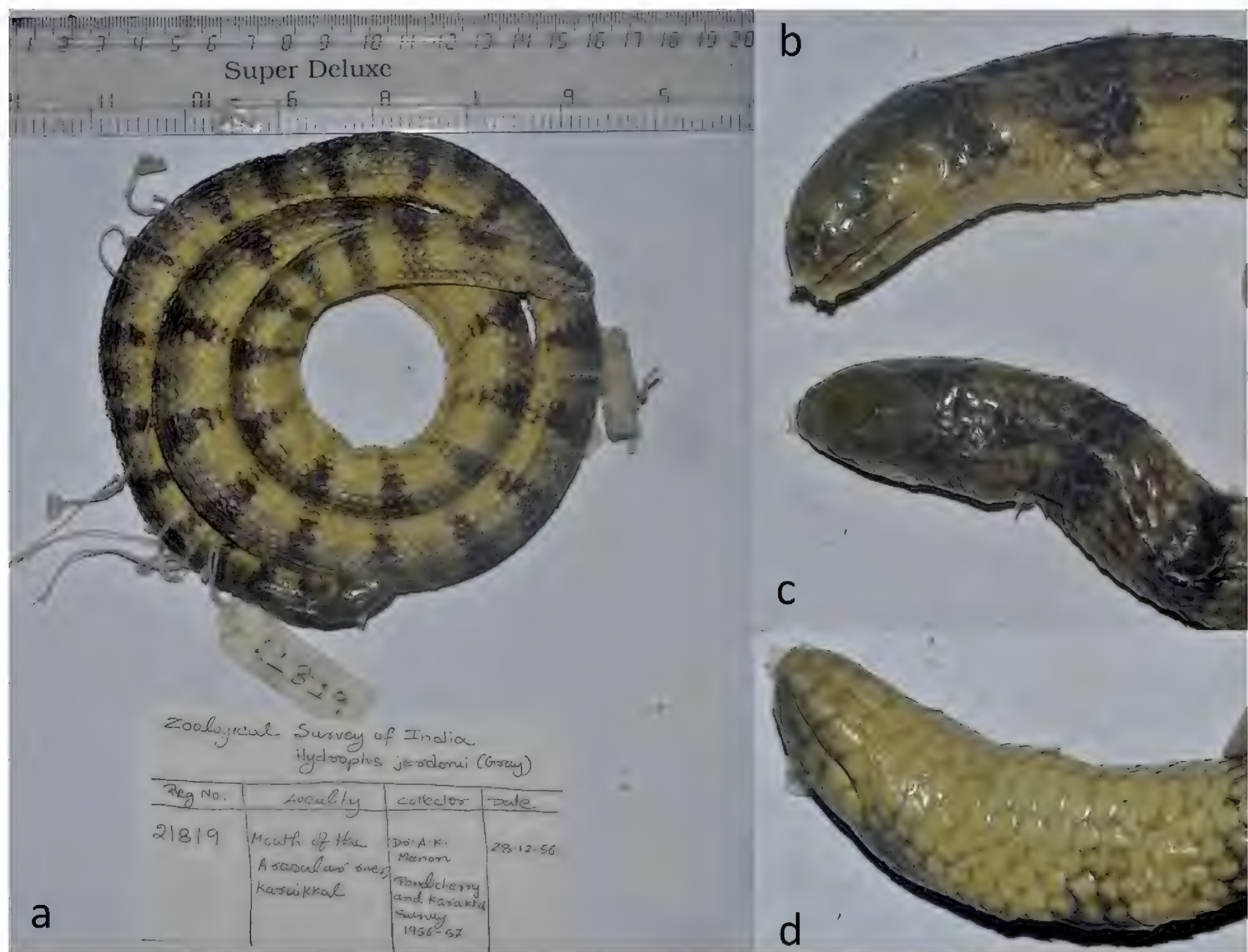


Fig. 1. *Hydrophis jerdoni* (ZSI 21819). **A.** Entire. **B.** Head lateral. **C.** Head dorsal. **D.** Head ventral profiles. Photo: Sonia Mondal.

***Hydrophis lapemoides* (Gray, 1849)**

(Fig. 2, Table 1)

Materials examined (n=4). **INDIA:** ZSI 27936, Tamil Nadu, coll. C.H. Satyanarayanan etc., 24.09.2003; BNHS 3357–58, Ervady, Gulf of Mannar, coll. Aaron Lobo 25.06.2005; **PAKISTAN:** ZSI 8632, Persian Gulf at Gwadar, Coll. Not Known.

Description and Variation. Head moderate, rostral broader than high, rarely higher than broad (ZSI 27936); nostril superior, nasal in contact with each other; prefrontal elongated, in contact with 2nd supralabial; frontal longer than the distance from the rostral; parietal longer than wide; single anterior temporal or 1+2; one supraocular on each side of head; one preocular on each side of head; 2–3 postocular on each side of head; 7–8 supralabials on each side of the head, 2nd supralabial touching prefrontal, 3rd and 4th touching the eye, sometimes 3rd, 4th & 5th touches the eye (ZSI 8632), 4th, 5th and 6th sometimes broken, last scales small; 8–9 infralabials on each side of the head, 3–4 infralabials touching chin shield, cuneate scale present between 3rd & 4th infralabial (ZSI 8632); chin shield well developed and in contact with each other or

sometimes posterior pair separated by 1–2 scales, anterior pair larger than posterior pair; scales around the neck 29–31; scales around midbody 39–41; ventrals 310–345, distinct throughout, slightly larger than the adjacent dorsal scales, posterior narrow; preanal enlarged; dorsal scale with single keel; number of bands around the body 37–58 as rhomboidal spots, 2–5 bands on the tail; head length 20.3–23.9 mm; head width 7.0–12.0 mm; head depth 8.3–8.7 mm; snout–vent length 643.0–863.0 mm; tail length 68.0–88.0 mm. Dorsum light reddish brown with dark greyish black bands till tail. Head reddish brown with black mark on frontal and parietals, lower labial brown.

***Hydrophis mamillaris* Daudin, 1803**

(Fig. 3, Table 1)

Materials examined (n=7). **INDIA:** ZSI 13392, Bay of Bengal, coll. Dr Walsh 20.05.1890; ZSI 19481, Gulf of Cambay, coll. S. T. William Carrick December, 1921; ZSI 22671 Digha beach on way to Paddapur, Midnapur district, West Bengal, coll. Dr A. K. Dutta 04.09.1964; BNHS 2329 (2 ex.), Mumbai, Maharashtra



Fig. 2. *Hydrophis lapemoides* (BNHS 3358). **A.** Entire. **B.** Head lateral. **C.** Head dorsal. **D.** Head ventral profiles. Photo: O.D. Adhikari.

coll. 31.12.1907; BNHS 2330, Alibaug, Raigad district, Maharashtra, coll. W.O. Alcock 01.07.1917; BNHS 2331 Kihim, Alibaug, Raigad district, Maharashtra, coll. Humayun Abdulali.

Description and Variation. Head small; rostral broader than high; nostril superior, nasal in contact with each other; prefrontal slightly elongated or triangular, in contact with 2nd supralabial (in one specimen prefrontal fused with nasal, ZSI 13392); frontal longer than the distance from the rostral; temporals 2+2, two specimens with only one anterior temporal (ZSI 19481 and ZSI 13392); one supraocular on each side of head; 1–2 preocular on each side of head; 1–2 postocular on each side of the head; 6–7 supralabials, 2nd touching the prefrontal, 3rd and 4th touching the eye (one specimen 3rd–5th touching the eye, BNHS 2329), sometimes 5th and 6th broken; 7–8 infralabials, 3–4 infralabials touching chin shields; chin shields well developed, both the pairs in contact with each other, one specimen where both the chin shields were separated from each other (ZSI 22671); scales around the neck 25–30; scales around the midbody 33–45; ventrals 260–350, distinct throughout, anteriorly scales larger than the adjacent dorsal scale, posteriorly narrow; preanal small; dorsal scale with no keels or feeble keeling; number of bands around the body 40–55; 2–9 bands on the tail; head length

12.8–17.4 mm; head width 5.4–7.0 mm; head depth 4.2–6.9 mm; snout-vent length 355.0–743.0 mm; tail length 35.0–80.0 mm. Dorsum light whitish grey ground colour with dark black bands across the body, ventral creamy interrupted by dark bands, tail black ventrally and posterior part, anteriorly same ground colour and banding as dorsal body. Head dark black with a streak of white mark across the supraocular and temporals, lower labial grey.

***Hydrophis nigrocinctus* Daudin, 1803**

(Fig. 4, Table 1)

Materials examined (n=3). **INDIA:** ZSI 24084 Bidhya river, Sunderban, 24 Parganas, West Bengal, coll. N.C. Gayen, 20.09.1983; **UNKNOWN:** ZSI 8239–40 no data.

Description and Variation. Head moderate; rostral higher than broad, visible from dorsal view of head; nostril superior, nasals in contact with each other; prefrontal squarish, not in contact with 2nd supralabial; frontal longer than the distance from the rostral; parietal longer than broad; temporals 2+3; one supraocular on each side of head; 1–2 preocular on each side of the head, one specimen with a scale present in between the prefrontal and nasal just above the 2–3 supralabials, on only one side of head; 2 postocular on each side of the head; 7 supra-

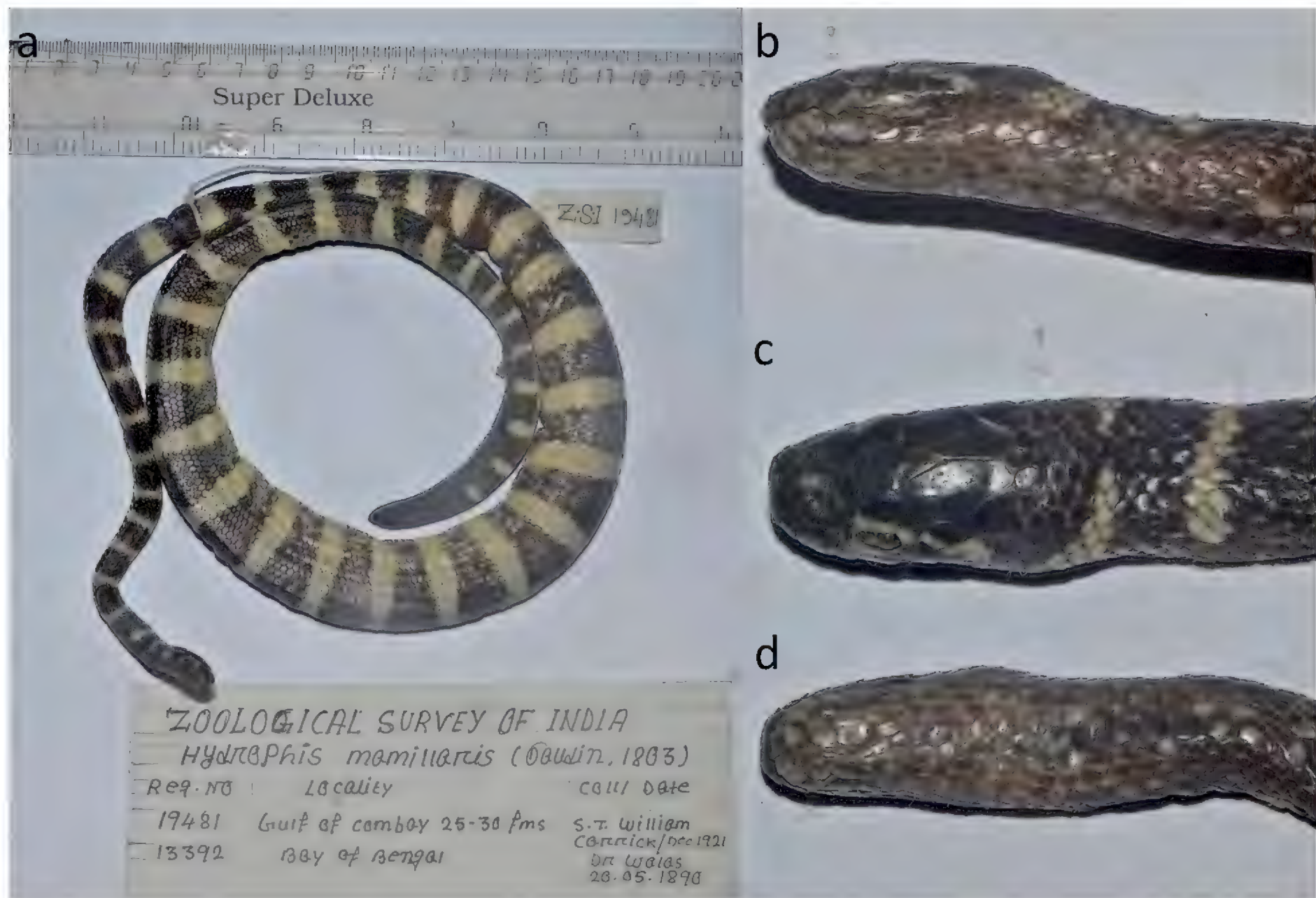


Fig. 3. *Hydrophis mamillaris* (ZSI 19481). A. Entire. B. Head lateral. C. Head dorsal. D. Head ventral profiles. Photo: S. Mondal.

labials, 4th touching the eye; 7–8 infralabials, 3 infralabials touching the chin shields, cuneate scales present between 2nd and 3rd or after 3rd infralabial; chin shields well developed, anterior pair in contact with each other, Posterior pair separated from each other; scales around the neck 27–30; scales around the midbody 36–42; ventrals 300–332, distinct throughout, not twice as broad as the adjacent dorsal scales; preanal slightly enlarged; dorsal scale with single keel; number of bands around the body 54–56, 6–10 bands on the tail; head length 12.9–27.3 mm; head width 4.3–12.3 mm; head depth 4.0–8.8 mm; snout-vent length 460.0–1105.0 mm; tail length 53.0–135.0 mm. Dorsum olive light brown ground colour with dark brown narrow bands, ventral light yellow colour, tail light brownish yellow with dark bands. Head olive brown with brown markings on the prefrontal, frontal and parietals, lower labial creamy yellow.

***Hydrophis stricticollis* Günther 1864**

(Fig. 5, Table 1)

Materials examined (n=3). INDIA: ZSI 8254, 8256 Hooghly, West Bengal, coll. H.L. Haughton; ZSI 23737, Gopalpur, Ganjam district, Odisha, coll. Dr M. Hafizullah 24.11.1977.

Description and Variation. Head small, rostral broader than high, nostril superior, nasal in contact with each

other; prefrontal slightly elongated, in contact with 2nd supralabial; frontal longer than or shorter than the distance from the rostral; parietal longer than broad; single anterior temporal or 1+2; one supraocular on each side of head; one preocular on each side of head; 1–2 postocular on each side of head; 7 supralabials, 2nd in contact with prefrontal, 3rd and 4th touching the eye, last scales small; nine infralabials, 3 infralabials touching anterior chin shield, cuneate scales present, last scale small; chin shield well developed, both the pair in contact with each other, in one specimen posterior pair separated by a single scale (ZSI 8256); scales around neck 32–39; scales around midbody 44–46; ventrals 378–451, distinct throughout, not twice as broad as the adjacent dorsal scales; preanal small; bands around the body is distinct in one specimen, with 44 bands, in another specimen anterior half of the body have 46 bands with posterior body with uniform dorsum colour and third specimen with faint diffused bands; head length 19.3 mm; head width 7.6 mm; head depth 7.3 mm; snout-vent length 890.0–955.0 mm; tail length 90.0–130.0 mm. Dorsum olive brown ground colour with feeble slightly darker bands visible anteriorly, tail olive brown interrupted with darker brown bands. Head olive brown, lower labial cream in colour.



Fig. 4. *Hydrophis nigrocinctus* (ZSI 82399). **A.** Entire. **B.** Head lateral. **C.** Head dorsal. **D.** Head ventral profiles. Photo: S. Mondal.

Hydrophis viperinus (Schmidt, 1852)

(Fig. 6, Table 1)

Materials examined (n=14). **INDIA:** ZSI 8274 Puri, Odisha, coll. October, 1971; ZSI 8277, Puri, Odisha, coll. Dr Fayrer, October, 1871; ZSI 13594 Ganjam coast, Odisha, coll. A. Neurham; ZSI 14481 Puri, Odisha, coll. D.I.L.Hendley; ZSI 16376 Puri, Odisha, coll. J.Ircurs Jenkins; ZSI 19209 Puri, Odisha Coast, coll. Dr B. Prashad 18.10.1919; ZSI 22650 Digba, West Bengal, coll. Dr A.K. Dutta 03.09.1964; ZSI 22651 Karwar shore, Mysore State, coll. Dr Ummur Kutty & B. Sinha 16.01.1967; BNHS 2284 Madras (= Chennai), Tamil Nadu, coll. Frank Wall 31.12.1907; BNHS 2285 Karwar, Uttar Kannada district, Karnataka coll. C.C. Boyd 31.12.1907; BNHS 2286 Odisha coast, coll. Charles Bailey 01.03.1915; BNHS 3362 Mandapam, Gulf of Mannar, Ramanathapuram district, Tamil Nadu, coll. Aaron Lobo 11.01.2005; BNHS 3413 Off Siquirim-Baga beach, Goa, coll. Aaron Lobo 22.01.2003. **MYANMAR:** ZSI 11497 Mergui, 7 miles from land, coll. Dr Anderson 16.01.1892.

Description and Variation. Head short, depressed, snout broadly rounded; rostral broader than high, nostril superior, nasal in contact with each other; prefrontal triangular, small, not in contact with supralabial; frontal longer than or smaller than the distance from the rostral; parietal longer than broad; 2 anterior temporals, sometimes 1+2, rarely one anterior temporal (BNHS 3413 and 3362); one supraocular on each side of head; one

preocular on each side of head, in one specimen single scale present between preocular and nasal (BNHS 2284); 1–2 postocular on each side of head; 7–8 supralabials, 2nd largest, 3rd–5th touching the eye or only two of them touching the eye; 7–9 infralabial, 3–4 infralabials touching the chin shields, cuneate scales present sometimes; chin shields well developed, both the pairs in contact with each other or anterior pair in contact with each other and posterior pair separated, rarely both the pairs separated, posterior pair larger than the anterior pair; scales around neck 28–33; scales around midbody 41–48; ventrals 225–266, distinct throughout, anteriorly more than twice larger than adjacent dorsal scale, broader, posterior narrow; preanal slightly enlarge; dorsal scale with single dorsal keel; bands around the body absent giving a uniform grey colour of the dorsum or sometimes rhomboidal bands present prominent along the later side, number of bands varies from 18–33 when present; head length 13.9–25.0 mm; head width 7.2–12.5 mm; head depth 4.6–9.3 mm; snout-vent length 260.0–679.0 mm; tail 38.0–83.0 mm. Dorsum uniform grey colour without bands, ventral creamy white, tail entirely black without any bands. Head dorsum uniform grey colour, upperlabial and lower labial creamy white.

Hydrophis obscurus Daudin, 1803

(Fig. 7, Table 1)

Materials examined (n=30). **INDIA:** ZSI 8253 Mouth of River Hooghly, West Bengal, coll. H.L. Haughton;



Fig. 5. *Hydrophis stricticollis* (ZSI 8256). **A.** Entire. **B.** Head lateral. **C.** Head dorsal. **D.** Head ventral profiles. Photo: S. Mondal.

ZSI 8255 Hooghly River, West Bengal, coll. Dr Anderson 1866; ZSI 17531-17534, 17538 Chilka Lake, Odisha; ZSI 17341-17345 Chilka Lake, Odisha, coll. Dr N. Anandale 21-31.07.1913; ZSI 18003-18010 Chilka Lake, Odisha; ZSI 20677 3/2 miles southeast of Bagauipara, Sunderban, coll. June 1929; BNHS 2320 (2 ex.) Karwar, Uttar Kannada district, Karnataka, coll. C.C.Boyd 31.12.1907; BNHS 2319 (4 ex.) Chilka Lake, Odisha, coll. H.W.Weslls; MYANMAR: ZSI 11496 Mergui, coll. Dr Anderson, 20.01.1892; UNKNOWN: BNHS 2321 (2 ex.) no data.

Description and Variation. Head small, rostral broader than high; nostril superior, nasal in contact with each other; prefrontal slightly elongated, in contact with 2nd supralabial; frontal smaller than the distance from the rostral, in one specimen the frontal is as long as the distance from the rostral (BNHS 2321); parietal longer than broad; single anterior temporal; one supraocular on each side of head; one preocular on each side of head, in one specimen preocular fused with prefrontal (BNHS 2320); one postocular on each side of the head; 6-7 supralabial, 2nd touching prefrontal, 3rd and 4th touching the eye; 6-8

infralabials, 3-4 infralabial touching the chin shield; chin shields well developed, anterior pair in contact with each other, posterior pair separated from each other or sometimes both the pairs in contact with each other, posterior pair larger than the anterior pair; scales around the neck 19-23; scales around midbody 26-32; ventrals 264-363, not twice as broad as the adjacent dorsal scales; preanal small, specimens of BNHS have slightly larger; number of bands around the body 45-69; 2-9 bands on the tail; head length 9.1-16.1 mm; head width 3.1-6.7 mm; head depth 2.5-6.4 mm; snout-vent length 395.0-1245.0 mm; tail 43.0-140.0 mm. Dorsum light grey ground colour with dark brown bands across the body, ventral brown, tail light grey with dark banding. Head dark brown dorsally with creamy white spots across the postocular to parietals and triangle shaped mark on the nasal and prefrontal, lower labial brown.

***Microcephalophis gracilis* (Shaw, 1802)**

(Fig. 8, Table 1)

Materials examined (n=22). INDIA: ZSI 8268 Hooghly, West Bengal, H.L.Haughton; ZSI 11460 and 11461



Fig. 6. *Hydrophis viperinus* (ZSI 16376). **A.** Entire. **B.** Head lateral. **C.** Head dorsal. **D.** Head ventral profiles. Photo: S. Mondal.

Puri, Odisha; ZSI 16549 Puri, Odisha, coll. B. Paira; ZSI 21825 Tranquebar (now Tharangambadi), Tamil Nadu, coll. A.G.K. Menon on 28.12.1956; ZSI 21826 Kalingimedu, Karaikkal, Tamil Nadu, coll. on 11.02.1957; ZSI 22521 and 22522 Sand head mouth of Hooghly, West Bengal, coll. P.V. Lady Fraser, in 1924; ZSI 22673 Digba beach on way to Paddapur, dist. Midnapur, West Bengal, coll. Dr A. K. Dutta on 03.09.1964; BNHS 2364 and 2365 Madras, Tamil Nadu, coll. Maj. F.Wall, on 31.12.1907; BNHS 2367, Alibaug, Raigad, Mumbai, Maharashtra, coll. W.O. Alcock, on 01.07.1917; BNHS 2368 Mumbai, Maharashtra; BNHS 3364 Pamban, Gulf of Mannar, Tamil Nadu, coll. Aaron Lobo on 07.01.2005; MYANMAR: ZSI 11484 Mergui (= Myeik), coll. Dr Anderson, on 20.01.1882; PAKISTAN: ZSI 8468 Persian Gulf at Gwadar, Baluchistan, coll. W.J. Blanford in 1872; ZSI 8543 Karachi, Pakistan, coll. Karachi museum; IRAN: BNHS 2359 Persian Gulf, coll. W.F.Townsend, on 31.12.1907; BNHS 2360, same as above, coll. on 01.01.1914; BNHS 2361 (2 ex), Chabahar, Persian Gulf,

coll. Capt. J.E.B. Hotson, on 21.03.1917; BNHS 2362, Jask, Persian Gulf, Hormozgan province, coll. Maj. K.G. Gharpurey, coll. 22.02.1918.

Description and Variation. Head very small, elongate, body long with slender anteriorly and thick compressed posteriorly; snout projecting beyond the lower jaw; rostral broader than high, except in one specimen with higher than broad (BNHS 2364), extending well on to the upper surface of the snout; prefrontal slightly elongated, touching the 2nd supralabial; frontal shorter than the distance from the rostral; parietal longer than broad; single anterior temporal, one example 1+2 (ZSI 14467); one supraocular on each side of head; one preocular on each side of head; one postocular on each side of head, rarely 2; 6 supralabial on each side of the head, 3rd and 4th touching the eye; 7 infralabials, 4 infralabials touching chin shield; chin shield well developed, both the pairs in contact with each other, anterior pair is smaller than the posterior pair, in one specimen anterior pair is larg-



Fig. 7. *Hydrophis obscurus* (ZSI 17344). A. Entire. B. Head lateral. C. Head dorsal. D. Head ventral profiles. Photo: S. Mondal.

er than posterior pair (BNHS 2367); scales around neck 19–20, in one specimens 17 (BNHS 2368), in another single specimen 21 (ZSI 16549); scales around midbody 27–38; ventrals 228–285, distinct from adjacent dorsal scale, posteriorly divided by a median furrow into two; preanal slightly enlarged; dorsal scale with feeble single keel, ventrals have a tubercle like strong keel; majority of the specimens with no banding on their body, some specimens with feeble banding on the posterior 2/3 of the body with number of bands around 35–52; head length 10.1–16.8 mm; head width 3.1–5.6 mm; head depth 3.4–5.3 mm; snout-vent length 525.0–809.0 mm; tail length 50.0–85.0 mm. Dorsum light brown anteriorly rest of the body creamy brown without any markings or bands till tail. Head brown dorsally, ventral light brown.

***Microcephalophis cantoris* (Günther, 1864)**

(Fig. 9, Table 1)

Materials examined (n=11). **INDIA:** ZSI 8231 Sand head, West Bengal; ZSI 8623 Mumbai, Maharashtra coll. Cockburn; ZSI 14459 Puri, Odisha, coll. Dr J.L. Hendley; ZSI 12587 Sargar road, West Bengal, coll. S. Ebon. Esq.; ZSI 18334 St. 14, Sandy Bay, North west of Nazarath point, Portuguese, coll. S.W. Kemp in August–

September 1916; ZSI 22579 From fishermen net at Saminanpathi 5 miles North Portonvo, Madras, Tamil Nadu, Collector: Dr A. Danial on 12.05.1960; ZSI 23029 Gopalpur, Ganjam, Odisha, coll. D.P.Sanyal on 15.11.1971; ZSI 23149 Digha coast, Midnapore, West Bengal, coll. T.K.Sen (Indo-Japanese survey) on 27.03.1975; BNHS 2369 (2 ex) Madras, Tamil Nadu, coll. Maj. F. Wall on 31.12.1907; BNHS 2370 Karwar, Uttar Kannada, Karnataka, coll. C.C.Boyd on 31.12.1907.

Description and Variation. Head very small, elongate, body long slender anteriorly and thick compressed posteriorly; snout projecting beyond the lower jaw; rostral higher than broad, extending well on to the upper surface of the snout; prefrontal slightly elongated, touching the 3rd supralabial, in two specimens prefrontal in contact with both 2nd and 3rd supralabial (ZSI 22579 and ZSI 23149); frontal smaller than the distance from the rostral, in 3 specimens it is larger than the distance from the rostral (BNHS 2369 A, ZSI 14459 and ZSI 8623), in 2 specimens frontal is as long as the distance from the rostral (ZSI 8231 and ZSI 12587); parietal longer than broad; single anterior temporal; one supraocular on each side of head; one preocular on each side of head; one postocular on each side of head; 6 supralabial on each side of the



Fig. 8. *Microcephalophis gracilis* (ZSI 16549). **A.** Entire. **B.** Head lateral. **C.** Head dorsal. **D.** Head ventral profiles. Photo: S. Mondal.

head, 3rd and 4th touching the eye, 5th largest; 7–8 infralabials, 4 infralabials touching chin shields; chin shields well developed, anterior pair in contact with each other whereas posterior pair separated by a scale, anterior pair larger than the posterior pair; scales around neck 23–25; scales around midbody 30–37, scales at the thickest part of the body 40–43; ventrals 383–430, distinct from the adjacent dorsal scale anteriorly, median furrow divides the ventral into two posteriorly; preanal small, in 3 specimens it is slightly enlarged (ZSI 18334, BNHS 2369B and BNHS 2370); dorsal scale have single feeble keel, dorsal scales adjacent to the ventrals have 3–4 dot-like keels, ventrals have small keel; number of bands on the body 49–60, bands are closely placed extending towards ventrals, in one specimen dorsum is uniform brown colouration (ZSI 12587), in another specimen bands present anterior 1/3 have feeble 25 bands, number of bands on tail 2–8; head length 10.4–21.7 mm; head width 3.7–11.1 mm; head depth 3.1–10.2 mm; snout-vent length 495.0–1305.0 mm; tail length 55.0–120.0 mm. Dorsum moderately brown with feeble darker brown bands more

prominent anterior part of the body than posterior half, ventral light creamy brown till tail. Head dark brown, lower labial light brown.

DISCUSSION

Some studies from India report on a few rare sea snake species. Murthy (1977) reported on sea snakes in Madras coast including rare species such as *H. jerdoni*, *H. viperinus* and *M. gracilis*. Talukdar & Dattagupta (1980) reported *H. mamillaris* and *M. gracilis* from Bengal coast. Murthy (1987) and Vekateswarlu et al. (1995) reported *H. obscurus* from Orissa Coast. Das & Chandra (1994) reported one species of rare sea snake, *M. cantoris* from Andaman and Nicobar Islands. In a study on the Gulf of Mannar coast near Palk Strait, Lobo (2006) reported rare species such as *H. viperinus*, *H. jerdoni* and *M. gracilis*. Karthikeyan & Balasubramanian (2007) reported *H. stricticollis*, *H. viperinus* and *M. gracilis* from Chennai-Pondicherry-Cuddalore-Nagapattinam coast.



Fig. 9. *Microcephalophis cantoris* (ZSI 18334). **A.** Entire. **B.** Head lateral. **C.** Head dorsal. **D.** Head ventral profiles. Photo: S. Mondal

Kannan & Rajagopalan (2008) reported *H. jerdoni* off Mangalore coast, in the Arabian Sea. Damotharan et al. (2010) reported *M. gracilis* from Parangipettai coast. They also reported a sea krait *Laticauda colubrina* from Parangipettai, whereas previous literature states it to be absent in mainland coast (Smith, 1943). Similarly, Dabhi et al. (2019) reported *H. mamillaris* from Gujarat coast, but the substantiations sadly fall short of normal standards and it is treated doubtful at best. Put together, the above reports are the available works that recorded uncommon, rare or little-known species of sea snakes in any part of the Indian coastlines.

On the other hand, as previously stated, data on commoner species come in frequently and in large quantities. As an example, we wish to highlight the fact that Wall (1918) expressly stated his collectors in Madras coast not to bring in any more *H. schistosus* specimens, as it got far more numerous than necessary. For one rare species, *Hydrophis* (earlier *Astrotia*) *stokesi* (Gray, 1846), we could not locate even a single specimen in these museums.

Whitaker & Captain (2004) dealt with that species with a picture depicting an extralimital population, i.e., from the Visayan sea, Philippines. Seen against that backdrop of Indian sea snake literature, this fresh set of descriptions of selected few rare species will facilitate their identification. It is hoped that this exercise of analyzing sea snake reports, identifying rarer sea snake species and specifically focusing on such rare species whilst giving this treatment on historical material, will help boost knowledge base on Indian populations of these rare sea snakes.

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Table 1. Morphological characters (measures in mm) of voucher specimens of rare sea snakes (*Hydrophis*, *Microcephalophis*) housed at the ZSI Kolkata and BNHS collections.

characters	<i>Hydrophis jerdonii</i>	<i>Hydrophis lapemoides</i>	<i>Hydrophis mamillaris</i>	<i>Hydrophis nigrocinctus</i>	<i>Hydrophis stricticollis</i>	<i>Hydrophis viperinus</i>	<i>Hydrophis obscurus</i>	<i>Microcephalophis gracilis</i>	<i>Microcephalophis cantoris</i>
temporal	1	1 or 1+2	2+2	2+3	1 or 1+2	2	1	1	1
supraocular	1	1	1	1	1	1	1	1	1
preocular	1	1	1–2	1–2	1	1	1	1	1
postocular	1	2–3	1–2	2	1–2	1–2	1	1	1
supralabials (touch eye)	6 (3,4)	7–8 (3,4,5)	6–7 (3,4,5)	7 (4)	7 (3,4)	7–8 (3,4,5)	6–7 (3,4)	6 (3,4)	6 (3,4)
infralabials (touch chin shields)	6–7 (1–3)	8–9 (1–3)	7–8 (1–4)	7–8 (1–3)	9 (1–3)	7–9 (1–4)	6–8 (1–4)	7 (1–4)	7–8 (1–4)
anterior scalerows	16–18	29–31	25–30	27–30	32–39	28–33	19–23	19–20	23–25
midbody scalerows	19–22	39–41	33–45	36–42	44–46	41–48	26–32	27–38	30–37
ventrals	214–258	310–345	260–350	300–332	378–451	225–266	264–363	228–285	383–430
preanals	slightly enlarged	enlarged	small	slightly enlarged	small	slightly enlarged	small	slightly enlarged	small
head length	12.1–24.1	20.3–23.8	12.8–17.4	12.9–27.3	19.3	13.8–25.1	9.1–16.1	10.1–16.8	10.4–21.7
head width	4.9–10.7	7.0–12.0	5.4–7.1	4.3–12.3	7.6	7.2–12.5	3.1–6.7	3.1–5.6	3.7–11.1
head depth	4.0–7.6	8.3–8.7	4.2–6.8	4.0–8.8	7.3	4.6–9.3	2.5–6.4	3.4–5.3	3.1–10.2
snout to vent length	375–958	643–863	355–743	460–1105	890–955	260–679	395–1245	525–809	495–1305
tail length	50–110	68–88	35–80	53–135	90–130	38–83	43–140	50–85	55–120
body bands	30–43	37–50	40–55	54–56	44–46	Absent	45–69	35–52	49–60
tail bands	2–4	2–5	2–9	6–10	Absent	Absent	2–9	Absent	2–8

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